UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,869	02/08/2002	Yixing Lin	006846 USA/CPS/IBSS	8725

32588 7590 12/28/2004

APPLIED MATERIALS, INC.
2881 SCOTT BLVD. M/S 2061
SANTA CLARA, CA 95050

EXAMINER	
MORILLO, JANELL COMBS	
ART UNIT	**PAPER NUMBER**
1742	

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/071,869	LIN ET AL.
	Examiner	Art Unit
	Janelle Combs-Morillo	1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *8-12,14-20,24,25 and 28-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *8-12,14-20,24,25 and 28-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 15 and 16 are objected to because of the following informalities: claim 15 is alternatively dependent on canceled claim 13. Appropriate correction is required.

Claim Rejections - 35 USC § 102/103

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 8-16 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Miyashita (5,039,388).

Miyashita teaches a high purity (column 3 lines 35-40) aluminum alloy with controlled particulate size of $\leq$ 2 μm (column 3 lines 48-49) for use in semiconductor processing apparatus (column 1 lines 7-13). Miyashita teaches an aluminum alloy example with 99.997% purity, and further containing 4% Mg, 20 ppm (0.002%) of each Fe and Si. The maximum particle diameter of intermetallic compounds such as β-AlFeSi, $TiAl_3$, or $MnAl_6$ do not exceed 1.5 μm (column 5 line 59), which meets the presently claimed microstructural limitations (all particles are less than 5 μm, none are between 5-20 μm, none are between 20-50 μm). Miyashita teaches that an anodic oxidation layer is applied to said aluminum alloy in order to increase corrosion resistance (column 2 lines 43-44, 63-64, column 3 line 9). Miyashita does not specify that any other intermetallic phases are present for said high purity Al-Mg alloy (column 3 lines 40-43).

Therefore, because Miyashita teaches a process of producing an article for semiconductor apparatus, wherein the aluminum substrate entirely overlaps the instant concentration ranges "with sufficient specificity" (see MPEP 2131.03), complete with a range of particles that is completely encompassed by the instant distribution, it is held that Miyashita anticipates the instant invention. Alternatively, because Miyashita teaches a method of producing a article, substantially as presently claimed, with overlapping alloying and particulate ranges, it is held that Miyashita has created a prima facie case of obviousness of the presently claimed invention.

Concerning claims 12-14, Miyashita teaches an aluminum alloy example with 99.997% purity, and further containing 4% Mg, 20 ppm (0.002%) of each Fe and Si. Miyashita does not mention the presence of Cu, Mn, Zn, Cr, or Ti, and therefore these elements are held to be substantially zero.

Concerning claims 15 and 16, because Miyashita teaches a substantially overlapping process, performed on a alloy that falls within the instant composition ranges and microstructural features, then the corrosion resistance with respect to active halogen species is inherently expected to be present.

Claim Rejections - 35 USC § 103

4. Claims 17, 20, 28, 31, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hisamoto et al (US 6,066,392) and Miyashita (5,039,388).

Hisamoto teaches a process for providing an anodic oxidation film on an aluminum alloy that is excellent in gas and plasma corrosion resistance (abstract). Hisamoto teaches the electrolytic oxidation process involves anodizing in an aqueous solution of 10-20g/l oxalic acid

and 100-200 g/l of sulfuric acid, which converts to 1-2% oxalic acid and 10-20% sulfuric acid (wherein 10g oxalic acid/ 1000g water=1%, 20g oxalic acid/ 1000g water= 2%, 1L=1000g of water). Hisamoto teaches that said electrolytic solution can be adjusted to control the incorporated amounts of C (oxalic acid) and S, C, and N (sulfuric acid) (column 10 lines 53-61). The electrolyte voltage in anodic oxidation is typically 5-200 V (column 9 line 14). Hisamoto does not disclose the temperature at which the anodizing treatment takes place, and therefore it is held to take place at substantially room temperature (approx. 20°C). Hisamoto does not teach the use of a high purity alloy with the instant microstructural characteristics.

Miyashita, who is also drawn to forming anodized coatings on aluminum alloys, teaches a high purity (column 3 lines 35-40) aluminum alloy with controlled particulate size of ≤ 2 μm (column 3 lines 48-49) for use in semiconductor processing apparatus (column 1 lines 7-13). The maximum particle diameter does not exceed 1.5 μm (column 5 line 59), which meets the presently claimed microstructural limitations (all particles are less than 5 μm, none are between 5-20 μm, none are between 20-50 μm). Miyashita teaches that an Al-Mg alloy composition of high purity is preferred because if particles > 2 μm are present on the surface of the material, they form electrode regions resulting in an inconsistent surface (column 3 lines 49-53). It would have been obvious to one of ordinary skill in the art to use the Al-Mg alloy with small particles in the process taught by Hisamoto, because Miyashita teaches that a more uniform anodizing layer can be achieved on Al-Mg alloys with maximum particle diameter <1.5 μm (column 5 line 59),.

Concerning claims 20 and 31, Hisamoto teaches that the pore sizes range 5-150 nm, which falls within the instant range of 30-75 nm.

Concerning claim 28, Miyashita teaches an aluminum alloy example with 99.997% purity, and further containing 4% Mg, 20 ppm (0.002%) of each Fe and Si. Miyashita does not mention the presence of Cu, Mn, Zn, Cr, or Ti, and therefore these elements are held to be substantially zero.

5. Claims 18-20, and 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hisamoto et al (US 6,066,392) and Miyashita (5,039,388), as applied to claims above, in view of "Aluminum and Aluminum Alloys" p 462-472.

Concerning claims 18 and 29 neither Hisamoto nor Miyashita teach the surface cleaning with the phosphoric/nitric acid solution substantially as presently claimed (though Miyashita teaches a surface pretreatment followed by water washing is customary to prepare the surface, column 4 lines 13-16). However, it is known to prepare the surface of articles to be anodized by cleaning with acidic solutions prior to anodization ("Aluminum and Aluminum Alloys" at p. 463 column 2). "Aluminum and Aluminum Alloys" teaches "the cleaning method is selected on the basis of the type of soils or contamination that must be removed" ("Aluminum and Aluminum Alloys" at p. 463 column 2). "Aluminum and Aluminum Alloys" details different cleaning process in section "Chemical Cleaning" on pages 455-457, and the 3rd column on page 457 teaches a Phosphoric acid-Nitric acid bath, which are widely used, and consist of: 45-98wt% Phosphoric acid (85%), 0.5-50wt% Nitric acid (60%), 2-35wt% H_2O, wherein said cleaning is carried out at 85-110°C for a time of 30 s- 5 min, which is substantially identical to the acid cleaning solution and parameters in instant claims 18 and 29.

Concerning claims 19 and 30, as seen in Fig. 3 on page 463 of "Aluminum and Aluminum Alloys", it is customary to rinse after cleaning.

Concerning claims 20 and 31, Hisamoto teaches that the pore sizes range 5-150 nm, which falls within the instant range of 30-75 nm.

Concerning claim 32, as stated above, Miyashita teaches performing cleaning and anodizing on a high purity aluminum alloy that meets falls within the instant particle distribution ranges. It would have been obvious to one of ordinary skill in the art to use the Al-Mg alloy with small particles in the process taught by Hisamoto, because Miyashita teaches that a more uniform anodizing layer can be achieved on Al-Mg alloys with maximum particle diameter <1.5 μm (column 5 line 59),.

6. Claims 24, 25, 33, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hisamoto et al (US 6,066,392) and Miyashita (5,039,388) in view of JP 08-311594 (JP'594).

Concerning claims 24, 25, 33, and 34 neither Hisamoto nor Miyashita teach the instant annealing treatment. However, JP'594 teaches that an Al-Mg alloy that overlaps the composition taught by the combination of Hisamoto and Miyashita has excellent tensile strength when subjected to a process annealing of 200-260°C (see abstract, etc.). It would have been obvious to one of ordinary skill in the art to anneal the alloy taught by the combination of Hisamoto and Miyashita at 200-260°C in order to obtain excellent tensile strength.

Response to Arguments/Amendment

7. In the response filed on December 6, 2004 applicant submitted various arguments traversing the rejections of record, as well as a 1.132 declaration.

Applicant's argument that the present invention is allowable over the prior art of record because Miyashita teaches no particles having a diameter exceeding 2 μm, and "the physical

behavior which is observed for an aluminum alloy, a maximum particle diameter is not indicative of a particle size distribution and is distinctly different in terms of what it teaches" (arguments p 9) has not been found persuasive. Though the instant claims are drawn to a distribution, the instant claims do not require a minimum amount of particles to be >2 μm. The range taught by Miyashita falls within the boundary of the presently claimed distribution limits. Applicant's claimed distribution does not require a given amount of particles be present in each category.

Applicant's argument that the present invention is allowable over the prior art of record because Miyashita is addressing the corrosion/erosion resistance of the anodic layer itself and not the underlying aluminum substrate, has not been found persuasive. Though Miyashita emphasizes the corrosion/erosion resistance of the anodic layer itself, the fundamental function of the anodized layer is to prevent the aluminum alloy from corrosion (Miyashita at column 2 lines 43-44, 63-64, column 3 line 9, "Aluminum and Aluminum Alloys" at p 462 3rd column). "Aluminum and Aluminum Alloys" teaches aluminum oxide is more corrosion resistant than the underlying aluminum alloy substrate, which is one of the principal motivations for the application of an anodized layer ("Aluminum and Aluminum Alloys" at p 462 3rd column).

Applicant's argument that the present invention is allowable over the prior art of record because Miyashita does not address the corrosion of the aluminum substrate beneath the anodized layer (arguments p 10) has not been found persuasive. Applicant has not shown specific unexpected results with regard to improved corrosion resistance of the aluminum substrate, wherein said results must be fully commensurate in scope with the presently claimed ranges.

The declaration under 37 CFR 1.132 filed December 6, 2004 is insufficient to overcome the rejection of claims 8-12, 14-20, 24, 25, 28-34 based upon Miyashita alone, or in view of Hisamoto, "Aluminum and Aluminum Alloys", and/or JP'594 as set forth in the last Office action because of reasons a) and/or b) below.

Concerning reason a), Aluminum alloy 6061 is not the closest prior art (the Si and Fe ranges do not fall within the instant ranges). The closest prior art is considered to be the example taught by Miyashita with 99.997% purity, and further containing 4% Mg, 20 ppm (0.002%) of each Fe and Si, balance aluminum, which has a particle distribution that falls within the instant limits.

Concerning reason b), the unexpected results are not commensurate in scope with the claimed invention (see MPEP 716.02 d). There is "no adequate basis for reasonably concluding that the great number and variety of compositions included in the claims would behave in the same manner as the tested composition" *In re Lindner*, 457 F.2d 506, 509, 173 USPQ 356, 359 (CCPA 1972). Whether the unexpected results are the result of unexpectedly improved results or a property not taught by the prior art, the "objective evidence of nonobviousness must be commensurate in scope with the claims which the evidence is offered to support." In other words, the showing of unexpected results must be reviewed to see if the results occur over the entire claimed range. *In re Clemens*, 622 F.2d 1029, 1036, 206 USPQ 289, 296 (CCPA 1980).

The examiner agrees that applicant has shown that a sample alloy that falls within the boundary of the instant claims has an unexpected low particle count and superior bubble test performance (which applicant states suggests improvement in semiconductor apparatus lifetime),

with respect to aluminum alloy 6061, however, items a) and b) as listed above, have not been met.

Additionally, independent claim 28 does not limit the high purity aluminum alloy with maximum ranges of Mg, Si, Fe, Cu, Mn, etc. to the inventive particle distribution, and Applicant has not shown the criticality of the anodizing process parameters given in claim 28.

Applicant pointed out that the XP'144 reference does not contain a date identifier. The examiner has therefore replaced XP'144 with "Aluminum and Aluminum Alloys" which also is drawn to typical anodizing cleaning and processing steps, see above.

Applicant's argument that the present invention is allowable over the prior art of record because there is no suggestion that the presently claimed specialized aluminum alloy substrate would provide improved performance when anodized (arguments p 17) has not been found persuasive. Said references are combined for the motivation given in the rejection above. "Aluminum and Aluminum Alloys" teaches that the use of a phosphoric-nitric acid bath is widely used (see "Aluminum and Aluminum Alloys" p 457).

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 8-12, 14-20, 24, 25, 28-34 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 26-33 of U.S. Patent No. 6,713,188 B1 (hereinafter US'188). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of US'188 teach a method of producing an anodized aluminum alloy article with the presently claimed particle distribution and ranges of alloying elements that fall within the scope of the instant ranges (see in particular, US'188 at claims 26 and 27).

10. Claims 8-12, 14-20, 24, 25, 28-34 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 13-24 of U.S. Patent No. 6,565,984 B1 (hereinafter US'984). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of US'984 teach a method of producing an anodized aluminum alloy article with the presently claimed particle distribution and ranges of alloying elements that fall within the scope of the instant ranges (see in particular, US'984 at claims 13, 14, 18).

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janelle Combs-Morillo whose telephone number is (571) 272-1240. The examiner can normally be reached on 8:30 am- 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

jcm
December 21, 2004